

1/PART

9/623895
533 Rec'd PCT/PTO 11 SEP 2000

English Translation
PCT/EP99/01166

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Data Bus for a Plurality of Nodes

Sub B1
The invention relates to a data bus for a plurality of nodes that are connected to one another via a star coupler. Such a data bus is known from the unpublished German patent application 19720401. Herein, the nodes are connected to the data bus via transmitter/sender modules. For optical bus systems, aging of the transmitter diodes or frequent reverse bending fatigue of the optical fiber or damage thereto can lead to a reduction of luminous power to the receiver diode, thereby resulting in malfunctions in the bus traffic. Such an error cannot be automatically detected and diagnosed.

The object of the invention is to provide a data bus of the aforementioned art that allows a degradation of transmission quality to be detected.

The object of the invention is achieved by the means of Claim 1.

Degradation of the optical transmission quality can be detected by the transmitter/receiver module. Said degradation is characterized, for example, by excessive attenuation or by the difference between dark current and photocurrent (useful current).

An advantageous development of the invention is described in Claim 2. In this manner, the frequency of faulty data transmission can be determined.

A further advantageous development of the invention is given in Claim 3. Addressability of the memory element allows the simple detection of which node(s) caused a faulty data transmission. To this end, for example, the status of said memory element can be read out by a microcontroller assigned to the star coupler, via a serial interface (SPI, for example).

Finally, the memory element, for example after a faulty transmission or after readout by the microcontroller, can be reset. A subsequently occurring faulty data transmission can be detected and distinguished from the preceding error.

The invention is further illustrated by means of a single figure. Said figure shows a detail representation of a data bus according to the invention whereby the mode of transmission of the nodes is monitored.

At a data bus D are represented two nodes T_n and T_{n+1} that are connected via S/E (transmit/receive) modules S/E_n and S/E_{n+1} . Said S/E_n and S/E_{n+1} modules convert optical messages in electric form received from said T_n and T_{n+1} nodes and relay these signals Di_n , Di_{n+1} as input signals to a logical decision gate (AND Gate 1) as the central component of a star coupler K. The number of inputs and outputs of said AND Gate 1 corresponds to the number of bus nodes. The output of said AND Gate drives all inputs (Do_n , Do_{n+1}) of said S/E_n and S/E_{n+1} modules. Said modules convert these electrical signals into optical signals and transmit same to said T_n and T_{n+1} nodes via optical transmission segments, not shown.

Degradation of the optical transmission quality (excessive attenuation, difference between dark current and photocurrent) can be detected by the transmit/receive module S/E_n or S/E_{n+1} . During a low level at the optical data input of said module, a detected error is reported at the data output of the star coupler via a brief low impulse as an additional input signal Di_n , Di_{n+1} .

This error state is stored at each input of the star coupler in a buffer (7). To each signal input is assigned a counter (8) which, within the scope of a transmission, is incremented by one if an error is reported by the corresponding S/E module. Said counters can be read out and reset via a serial interface (SPI, for example) of a microcontroller. With this function, the optical transmission paths of all bus nodes can be diagnosed.